

1

# Conservation strategies for mixed audio-visual collections in practice

Albanian Cinema Project  
**«Archives in Motion»**  
 Marubi, Tirana, Albania  
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2

	<b>quick</b>	<b>longtime</b>
<b>important</b>		
<b>not important</b>		

3

# Strategy

4

## Develop a strategy

1. list the ISO standard for each media type which is present in the collection
2. assess the environment inside each vault at least for one year
3. inspect the condition of the collection
4. analyse the results and find the weak link
5. improve the conservation

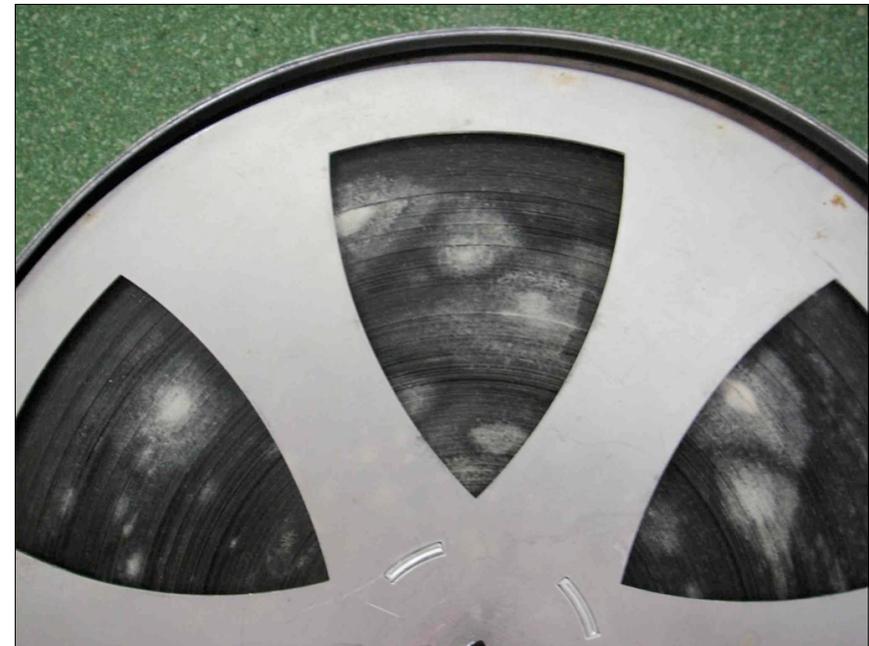
5

TYPE of DECAY	MEDIA	RECOMMENDED ENVIRONMENT
SILVER IMAGE DECAY	Photographic glass plates Black-and-white film Black-and-white photographic prints	30% to 50% RH
COLOR IMAGE DECAY	Color film Color photographic prints Ink jet prints	Low temperature 30% to 50% RH
COLOR BLEEDING	Ink jet prints	30% to 50% RH
YELLOWING, STAINING	Color photographic prints Inkjet prints	Low temperature 30% to 50% RH
BINDER DEGRADATION	Magnetic tapes	Low temperature 30% to 50% RH
NITRATE DECAY	Nitrate-base film	Low temperature 30% to 50% RH
ACETATE DECAY	Acetate-base black-and-white film Acetate-base color film Acetate-base magnetic tape	Low temperature 30% to 50% RH
GLASS DETERIORATION	Photographic glass plates	30% to 50% RH
LAYER SEPARATION	Photographic glass plates CDs and DVDs	Minimal temperature and RH fluctuations 30% to 50% RH
MOLD	All media	30% to 50% RH

6



7



8

## Principle

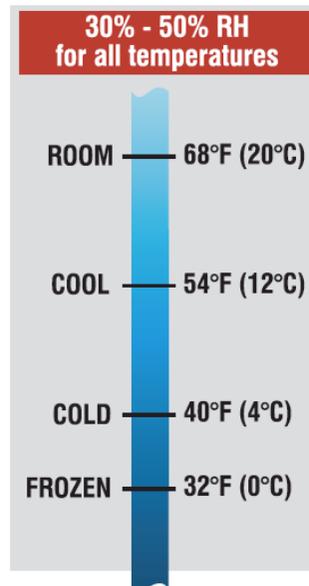
In order to guarantee the conservation, one must know both the **condition** of the each media type **and** the **climate** in each storage vault:

- condition of the collection
- temperature and relative humidity

9

## Model

10



11

### QUALITATIVE RATING SYSTEM

<b>NO</b>	Likely to cause significant damage.
<b>FAIR</b>	Does not meet ISO recommendations but may be satisfactory for extended periods.
<b>GOOD</b>	Comparable to ISO recommendations. <sup>12</sup>
<b>VERY GOOD</b>	Will provide an extended lifetime.

12

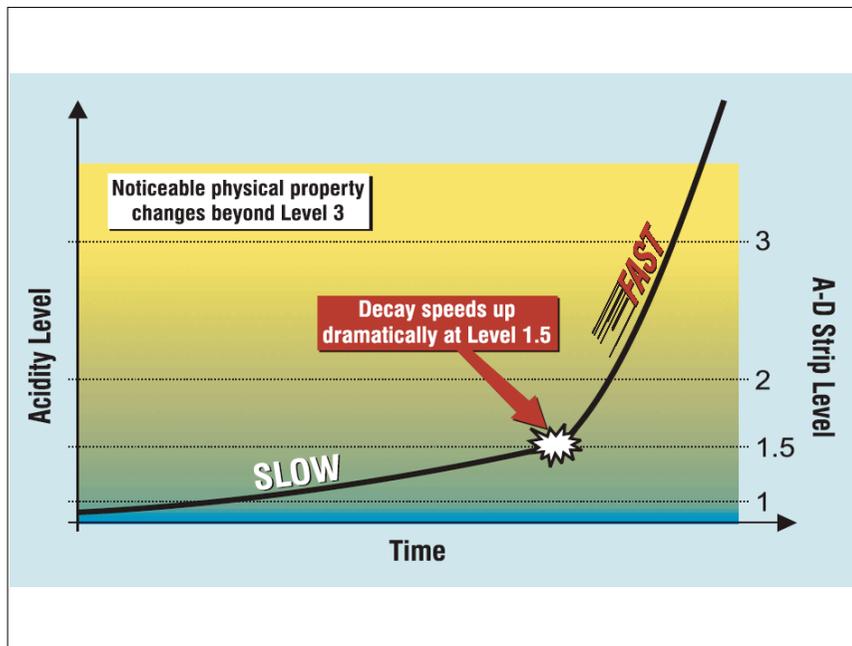
Storage Conditions	Glass Plates	Nitrate	Acetate		Polyester		Photo Prints		Ink Jet Prints	Magnetic Tape		CDs DVDs
			B&W	Color	B&W	Color	B&W	Color		Acetate	Polyester	
ROOM	Fair	No	No	No	Good	No	Good	No	Fair	No	No	Fair
COOL	Good	No	No	No	Good	No	Good	No	Fair	Fair	Good	Good
COLD	Very Good	Good	Good	Good	Very Good	Good	Very Good	Good	Good	Good	Good	Good
FROZEN	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Good	Good	No

13

## Four climate zones

	T	RH
<b>room</b>	20 °C ± 2 °C	50% ± 5%
<b>cool</b>	16 °C ± 2 °C	35% ± 5%
<b>cold</b>	4 °C ± 2 °C	45% ± 5%
<b>frozen</b>	-8 °C ± 2 °C	microclimate

14



15

## Life expectancy

	T	RH	t
<b>room</b>	20 °C	50 %	1,0 x
<b>cool</b>	16 °C	35 %	2,5 x
<b>cold</b>	4 °C	45 %	9,5 x
<b>frozen</b>	-8 °C	50 %	46,0 x

16

# 1. Cool

17

## Conservation

Conservation encompasses all activities for the care of an object, which **delay its further decay** and ensure that it remains in the most intact condition for the future.

18

Until autocatalysis (acetate)

	<b>T</b>	<b>RH</b>	<b>years</b>
<b>room</b>	20 °C	50 %	44
<b>cool</b>	16 °C	35 %	110
<b>cold</b>	4 °C	45 %	414
<b>frozen</b>	-8 °C	50 %	2 021

19

# 2. Cold

20

## Restoration

Restoration includes all interventions and treatments that serve to **retrieve a certain historical state** and contribute to the legibility, aesthetic integrity or **reuse** of an object.

Restorative actions may be irreversible and require great care in planning, justification, execution and **documentation**.

21

## From autocatalysis on (acetate)

	T	RH	years
room	20 °C	50 %	7
cool	16 °C	35 %	18
cold	4 °C	45 %	67
frozen	-8 °C	50 %	322

22

## 3. Frozen

23

## Emergency (acetate)

	T	RH	years
room	20 °C	50 %	1/2
cool	16 °C	35 %	1
cold	4 °C	45 %	5
frozen	-8 °C	50 %	23

24

# Implementation

25

## Active measures

Air conditioning:

- refrigerate
- dehumidify
- filter

26

## Air pollutant...

- $\text{SO}_2 < 1 \mu\text{g}/\text{m}^3$
- $\text{NO}_x < 5 \mu\text{g}/\text{m}^3$
- $\text{O}_3 < 25 \mu\text{g}/\text{m}^3$

27

## Outgassed acid

- $\text{CH}_3\text{COOH} < 1 \text{ ppm}$
- $\text{HNO}_3 < 1 \text{ ppm}$

28



29

## Air flow (1)

Outgassed nitric acid or acetic acid are heavy gases:

- air supply at the ceiling of one wall
- air exhaust at the bottom of the opposite wall

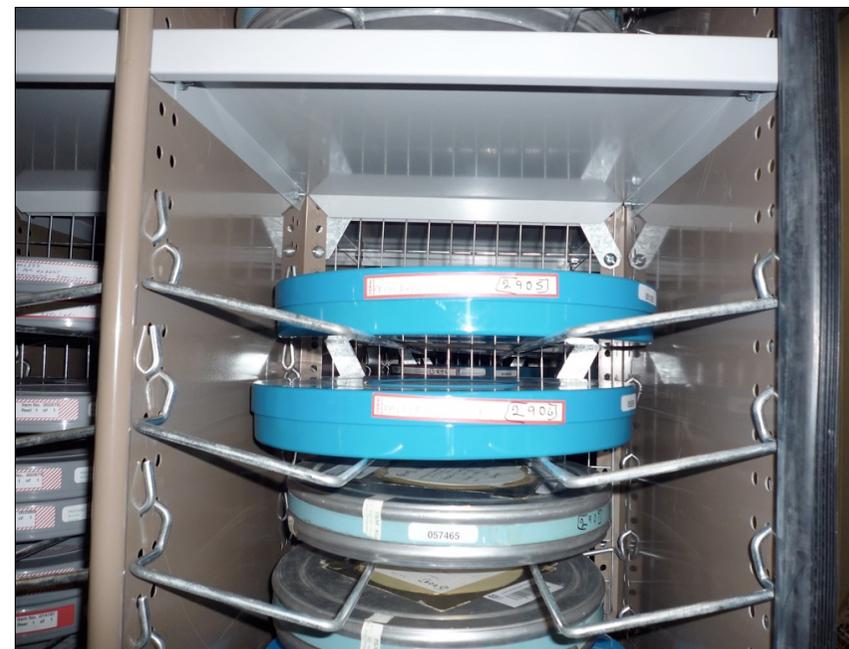
30

## Air flow (2)

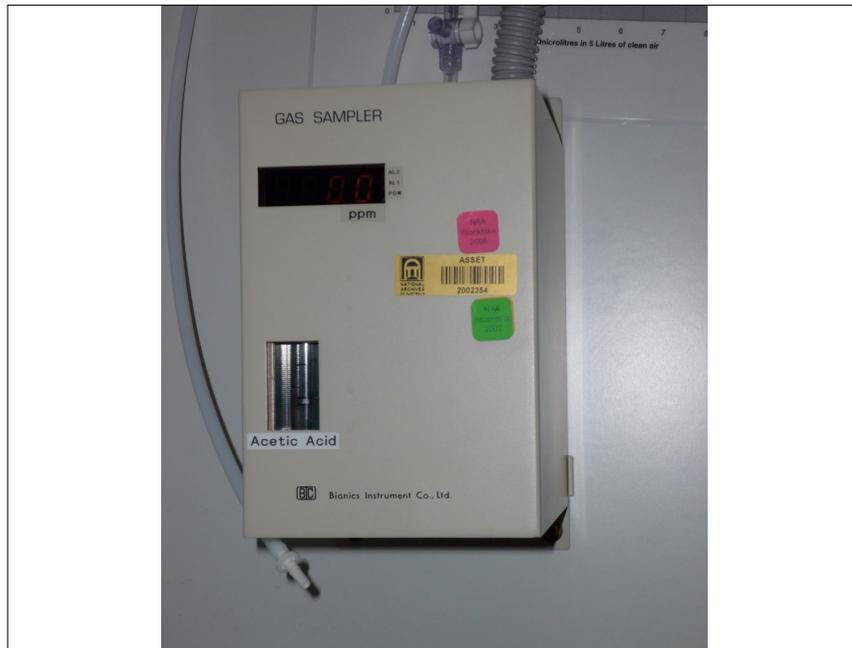
Nitric acid or acetic acid should nowhere concentrate:

- vented cans
- fixed and open shelves
- air supply and air exhaust on the full length of the opposite longer walls

31



32



33

## Passive measures

- location
- orientation
- exterior paint colour
- shadow
- insulation
- humidity barrier
- apertures (doors, windows, cables)

34

## Interaction

- air conditioning
- insulation
- architecture
- materials

35

## Advantages

Clear and efficient infrastructure:

- smaller air conditioning
- lower energy costs
- less maintenance
- limited material requirements

36

# Summary

37

## Live in the real world

There is only one efficient way:

- keep the «originals»
- more prevention:
  - better insulation
  - more efficient air conditioning
- less handling of the «originals»
- make access copies

38

## Bibliography

Peter Z. Adelstein: **IPI Media Storage Quick Reference**. 2nd Edition. Image Permanence Institute, Rochester NY 2009

[www.imagepermanenceinstitute.org](http://www.imagepermanenceinstitute.org)

**Dew Point Calculator**. Image Permanence Institute, Rochester NY [2008]

[www.dpcalc.org](http://www.dpcalc.org)

39

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40